National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Global Change and Energy: JPL Actions

for

Raytheon

November 5, 2008

Ken Wolfenbarger

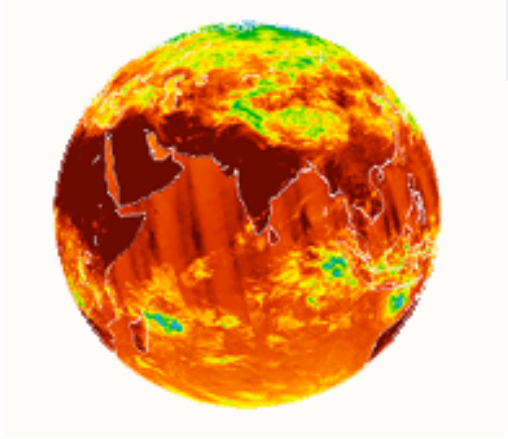
NASA Jet Propulsion Laboratory

California Institute of Technology

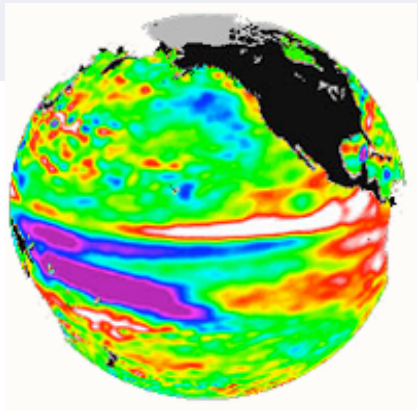
National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology

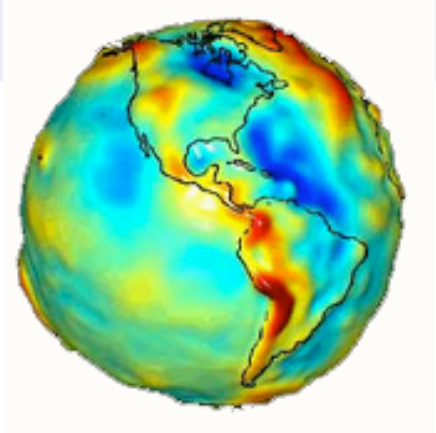
Examples of Current Measurements



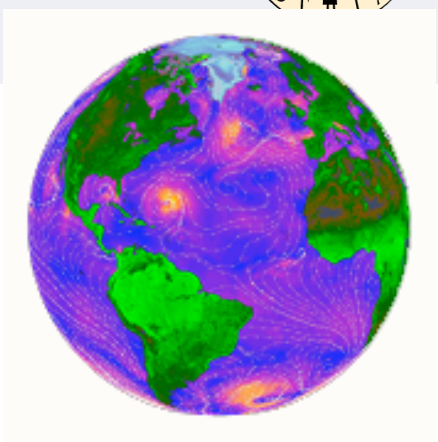
Atmospheric Infrared Sounder (AIRS) provides monthly global temperature maps



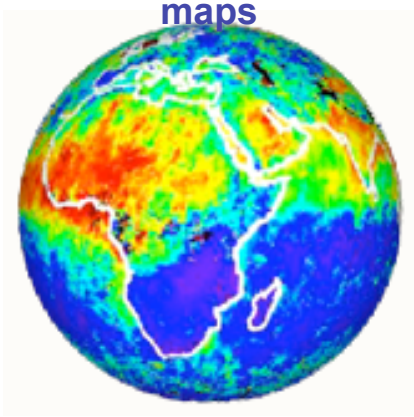
Jason provides global sea surface height maps every 10 days



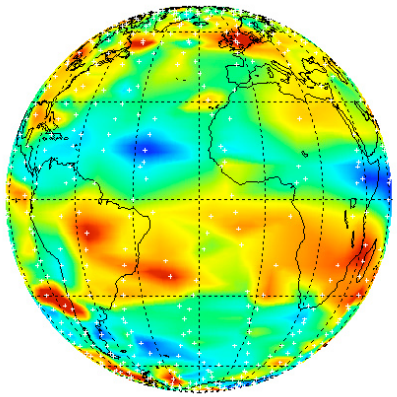
Gravity Recovery and Climate Experiment (GRACE) provides monthly maps of Earth's gravity



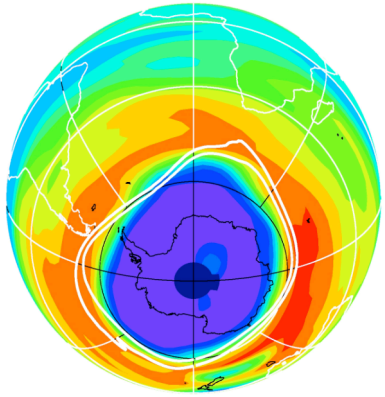
QuikSCAT provides near global (90%) ocean surface wind maps every 24 hours



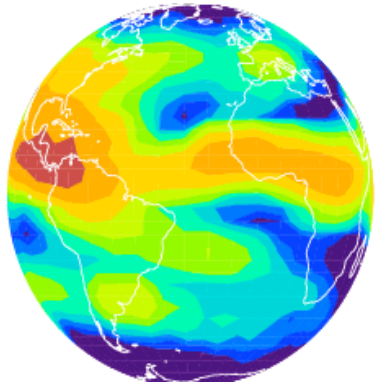
Multi-angle Imaging Spectro Radiometer (MISR) provides monthly global aerosol maps



Tropospheric Emission Spectrometer (TES) provides monthly global maps of Ozone



Microwave Limb Sounder (MLS) provides daily maps of stratospheric chemistry



CloudSat provides monthly maps of cloud ice water content

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

JPL is responding to critical National needs in global change

1. Create an observational system to support climate agreements
2. Ensure, develop sustained global climate records
3. Create access to distributed climate information
4. Reduce the uncertainty in climate model forecasts
5. Provide climate information for decision makers

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Create access to distributed climate information

What

Link climate information at numerous agencies to climate modelers and the climate science community

Why

Large amounts of climate data are not utilized for climate research (ease of access, interpretation, translation)

How

Create a micro-scale test at JPL and LLNL, and scale-up after successful test

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Reduce the uncertainty in climate model forecasts

What

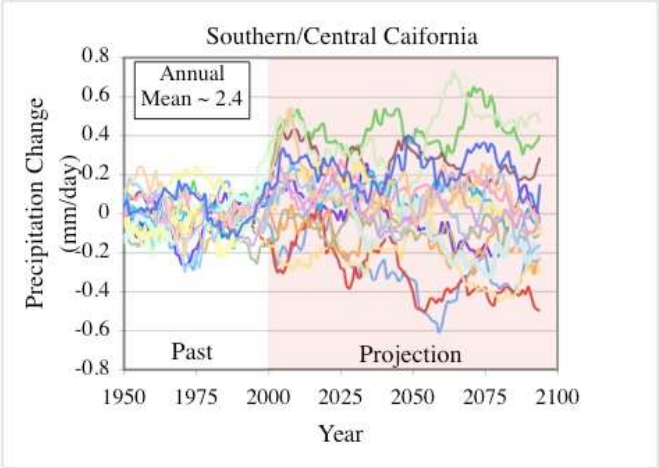
Improve the accuracy of global and regional climate models

Why

Existing uncertainties in climate models create large uncertainties in the impacts of climate change

How

Use global observational data to improve the physics of climate models



Source: IPCC, 2007

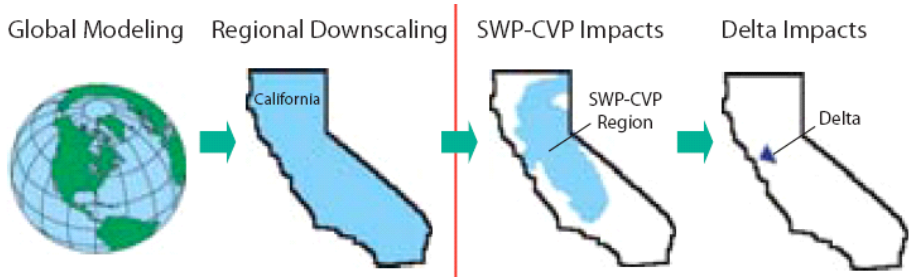
National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Provide climate information for decision makers

What

Convert climate science results into information that can be used by decision makers



Why

Decision support tools will help the Nation's decision makers improve analysis of options and investments

How

Create tools and services that translate climate science results into information needed by decision makers

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Create an observational system to support climate agreements

What

Create a global system to observe greenhouse gas emissions to construct and verify international treaties and cap and trade programs.

Why

International agreements will be required to reduce greenhouse gas emissions, and an observation system will be required to verify compliance.

How

Create an initial design based on proven space and ground technology at NASA and NOAA.

NASA's Orbiting Carbon Observatory (OCO) together with in situ and aircraft measurements provide the first step toward a global CO_2 Monitoring Network

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Ensure sustained global climate records

What

Provide the infrastructure to ensure long term records of critical climate data are created

Why

Climate change is slow process and long term records will ensure we understanding what is happening and how accurate the models are

How

Work with the science community to identify critical climate variables and identify options to create these records

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

JPL is responding to critical National needs in global change

1. Actions aligned with critical national climate needs
2. Actions aligned with core JPL strengths in climate observation systems, science and system engineering
3. Success relies on working with key partners within NASA, NOAA, DOE, etc. and a National focus